54th Annual W.W.O.A. Conference
October 20-23, 2020
Kalahari Resort, Wisconsin Dells
The Clarifier is the publication of the Wisconsin Wastewater Operators’ Association and is intended to inform and educate the membership on issues related to the treatment and control of wastewater. The Clarifier is produced five (5) times each year: February, April, June, September, and December. All members are encouraged to contribute to the mission of the Clarifier.

The Wisconsin Wastewater Operators’ Association is a non-profit organization dedicated to educating, informing, and advancing the wastewater profession. WWOA has approximately 2,000 members divided throughout six regions: Southeast, Southern, Lake Michigan, North Central, Northwest, and West Central.
Presidents message: Try a different resolution this year

I hope you and your family enjoyed the holiday season, and were able to take some time out of your busy lives to spend some time with family and friends. As I’m writing this message I’m looking out the window at a snowy, wintery scene. Winter is a time of year where it’s often cold and snowy, and quite frankly, not that picture-perfect day on the beach many people dream about. As an avid outdoorsman I truly enjoy all four seasons, but to do so you have to find a hobby or activity that fits your personal interests and location.

We all know there are some of those days when it is just not enjoyable to be outdoors in Wisconsin in the winter time; however, there are plenty of calm sunny days in the winter where a little warm clothing will be plenty to keep you comfortable if you remain active. Get outside, get some fresh air, and get the blood pumping this winter. If you’re not an avid snowmobiler or ice fisherman, there are plenty of other winter activities to enjoy in Wisconsin to get you outdoors and make the season more enjoyable. Take a walk in a local park or through your community to admire the beauty of nature in this frigid season. Strap on a pair of snowshoes and take a hike through the woods to explore all of the tracks, trails, and signs of wildlife that you would otherwise assume are nowhere to be found during this season. As you begin to look a bit closer, you’ll find there’s a lot more to see and experience than you believe. Give cross-country skiing or downhill skiing a try. There are plenty of facilities that offer lessons and used apparel if you’re willing to give it a try. Whatever you do, take some time out of your busy life to get outside and enjoy the season.

This is also the time of year where people traditionally make their New Year’s resolutions. This year, rather than making the same old resolution to lose weight (which most of us are never very enthusiastic about), try making a resolution to do something you are motivated to do and passionate about. Do something that will make a difference in the wastewater industry. Contact the local school in your community and offer to talk to one of the classes about the importance of clean water and what you do for a living. Offer a tour of your facility to local schools, civic groups, boy scouts, girl scouts, etc. Write an article in your local newspaper to explain how vital your role is to public health and the environment. Promote the wastewater industry and demonstrate how it fits into the new focus on STEM (Science, Technology, Engineering, and Math) careers. This is your chance to connect with your local community.

As a professional in the wastewater industry you have the opportunity to break down the misunderstandings of what wastewater is like and help elevate the profession to be something high school students are aware of and consider as they select a career path along with the appropriate university or technical college. Talk to your local high school guidance counselor and ask them to integrate more information about careers in water and wastewater into their list of career options. There are countless ways you can do your part in the community.

This year, rather than making that same old weight loss resolution, go make a difference in your community and help raise awareness to encourage the next generation to have a passion for water. Future generations will thank you.

Jeff Smudde

Remaining Clarifier Deadlines

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The Village of Mount Horeb is a community of approximately 7,300 located on the edge of the Driftless Area in western Dane County. Approximately 25 minutes from Madison, the scenic community known as the “Troll Capital of the World” draws many visitors to experience the unique troll sculptures that line Main Street and experience the rich Norwegian Heritage of Mount Horeb.

The first wastewater treatment plant in the village was located on Parkway Drive in what was then the western extent of the village. A growing population resulted in the need for a new wastewater treatment facility, which was constructed in 1978 at its current location on Sand Rock Road, south of the village. This facility consisted of a comminutor, aerated grit removal, primary clarification, rotating biological contactors (RBCs), final clarification, sand filtration, chlorine disinfection, and post aeration. Primary and RBC sludge was aerobically digested and then hauled off site for land application.

Continued growth within the community, as well as mechanical issues with the RBCs resulted in a significant improvement project in 1989. This project included construction of a new preliminary treatment building housing a mechanical screen and grit classifier. The RBCs were replaced with three activated sludge aeration tanks and a return activated sludge (RAS) pumping station. A second sand filter was added, and the chlorine contact tanks expanded to increase capacity and allow for dichlorination. A gravity belt thickener was installed and two liquid sludge storage tanks were constructed to allow for onsite storage of thickened digested sludge.

As a result of new phosphorus effluent limits, new chemical phosphorus removal facilities were constructed in 1996. These facilities consisted of new bulk ferric chloride storage, chemical pumps, and piping necessary to dose ferric upstream and downstream of the aeration basins.

To proactively plan for continued growth within the community, the Village commenced a master planning process in 2004, updating the plan approximately every 5 years. The 2009 plan investigated alternatives for continued on page 6
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expanding both forward flow and solids treatment capacity. Because the existing WPCF site was bound on the west by the West Branch of the Sugar River and on the east by Sand Rock road, expansion opportunities at this site were limited. This resulted in evaluation of membrane bioreactors and other technologies that could be implemented on a tight site. A determination was made that conventional treatment practices on a new site (hereinafter referred to as the “north site”) would be most cost effective in the long term and allow for significant future growth. As a result, the Village purchased approximately 100 acres of farm land immediately northeast of the existing WPCF site, with the intent of using this property for future WPCF expansions.

In 2014, the Village completed major improvements to the preliminary treatment process, including replacement of the existing preliminary treatment building, installation of a new mechanical step screen, new vortex grit removal, and a new grit classifier.

In 2015 the Village commenced facilities planning for continued growth and to address aging equipment and processes. This plan concluded that construction of new forward flow facilities on the north site, with repurposing of existing facilities on the existing site (hereinafter referred to as the “south site”) would be most cost effective. This solution also met the Village’s goal of providing facilities that could serve the Village for several decades into the future, not just the next 20 years, as the additional land will allow for significant future expansion should it be required. Design of the project concluded in early 2017. Construction started in mid-2017 and wrapped up in late 2019. The project consisted of new oxidation ditches, final clarifiers, RAS and WAS pumping, and an administration building on the north site. Construction on the south site included conversion of the existing primary clarifiers to fermentation reactors, construction of a new pumping station, retrofitting the existing chlorine contact basins with ultraviolet light disinfection, conversion of the existing aeration basins to aerobic digestion, replacement of the gravity belt thickener, construction of a third liquid biosolids storage tank, and demolition of one of the existing final clarifiers (the second existing final clarifier was retained for potential future RAS fermentation), RAS pumping station, aerobic digesters, and administration building. Significant streambank restoration and site improvements were also completed. Design and
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construction engineering services were provided by Strand Associates, Inc.; Staab Construction Corporation was the general contractor on the project.

Current WPCF Description
The current WPCF is designed for an average year 2040 flow of 0.79 MGD and average BOD loading of 1,900 lbs/day. All facilities were designed and laid out such that every process can be expanded by at least 100 percent, should future growth in the Village require further expansion of the WPCF.

Wastewater from the village first flows through the Preliminary Treatment Building, which includes a 3-millimeter step screen. Screenings are washed and compacted and conveyed to a dumpster. Influent flow is sampled after the step screen and then flows to the vortex grit removal system. Grit slurry is pumped to a grit classifier also located in the Preliminary Treatment Building where it is dewatered and conveyed to the dumpster.

Photo by Joey Godiska

Village of Mount Horeb WPCF. North (new) site in foreground, south (existing) site in background

Preliminary treatment – Mechanical screen and grit classifier

During the facilities planning process, bench scale biological phosphorus removal (BPR) potential testing was completed to determine how amenable the influent waste would

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be to BPR. As expected, this testing showed a better phosphorus release with the primary effluent than the influent wastewater. Because the planned WPCF did not include primary clarification, repurposing of the existing primary clarifier tanks provided an excellent opportunity for fermentation of the influent wastewater. The fermentation reactors provide a significant solids retention time, which allows the biological matter to be reduced to provide more soluble BOD and volatile fatty acids to facilitate the BPR process. A new splitter structure was constructed to direct a portion of the flow to the fermenters, allowing the remaining flow to bypass directly to the influent pumping station. The existing primary clarifier tanks were retrofitted and converted to fermentation reactors by removing the clarifier equipment, installing submersible mixers, and installing influent baffles to direct wastewater down to elutriate through the biomass. By controlling the mixer run times and durations, and the flow rate into the fermenters, the hydraulic and solids retention times in the fermentation reactors can be managed.

Following fermentation, a pumping station pumps the fermenter effluent to the oxidation ditches on the north site. The pumping station is a submersible station housing four pumps and includes bypass piping to allow for quick bypassing of the station in emergency conditions. The oxidation ditches (located on the north site) are arranged in two parallel trains. Each train includes two anaerobic selector basins, followed by an anoxic basin and aerated basin. The oxidation ditches operate in the A2O BPR process. Backup chemical phosphorus removal

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facilities were also provided on the north site to provide phosphorus removal during periods of less efficient BPR.

Two new final clarifiers were constructed on the north site. The clarifiers are 45 feet in diameter, with 15-foot sidewater depths. Aluminum domes were provided for algae control and to prevent issues with freezing in cold weather.

A new RAS/WAS pumping facility was also constructed at the north site. The basement of this building houses three RAS pumps (one for each clarifier and swing pump). WAS is automatically wasted off the RAS line by use of a magnetic flow meter and modulating valve. RAS is returned to the oxidation ditch splitter box and WAS is piped to the aerobic digesters at the south site. This building also houses switch gear, motor control centers, and the supervisory control center for the equipment at the north site. A scum pump located in the basement of this building is used to pump scum from the final clarifiers to the aerobic digester.

Following final clarification, flow returns to the effluent filter building at the south site via gravity sewer. The existing sand filters in this building were abandoned and equipment removed, but it is anticipated that this building may be repurposed with disc filtration to enable the Village to meet the more stringent effluent phosphorus limits anticipated to go into effect in 2027. Flow is then routed through a UV disinfection system that operates seasonally, from May through September. Disinfected effluent then flows through cascade aeration and is discharged in the nearby West Branch of the Sugar River.
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WAS from the north site is pumped to the aerobic digesters (repurposed aeration basins) at the south site. Currently, two of the three tanks are typically used for digestion; the third tank is available for future growth. Air to the digesters is provided by a hybrid blower, backed up by two centrifugal blowers. The tanks were outfitted to automatically decant at operator adjustable intervals by using telescoping valves on automatic actuators.

Digested sludge is then thickened with a gravity belt thickener, which was replaced in the recent project. Digested sludge is thickened to approximately 5 percent solids and then pumped to one of the three biosolids storage tanks, which provide 180 days of storage capacity at year 2040 design loadings. As a result of the recent conversion from chemical phosphorus removal to BPR, a 25-30 percent decrease in solids production has been realized. In the spring and fall, the biosolids are removed by a contract hauler who then applies it to agricultural land.

The new WPCF, combined with operations by the Mount Horeb WPCF staff produce an excellent quality effluent. The new WPCF aligns the Village of Mount Horeb very well for reliable wastewater treatment for many decades to come.

Left to right - Dale Cullen (lead operator), John Klein (superintendent), Eric Rohowetz, Dennis Johnson (operators).
North Central Laboratories hosts North Central August meeting

The North Central Region in conjunction with North Central Laboratories (NCL) co-hosted our Summer Regional Meeting / Laboratory Training Session at the NCL training facility, in Birnamwood, WI, on August 8th. There were approximately 76 people in attendance.

Mike Raynovic, North Central Laboratories, welcomed the attendees and briefly reviewed the agenda, speakers, facility tour, and housekeeping for the day. Mike started off the meeting as the first speaker of the morning, with a presentation on Titrations. Mike explained that titrations follow a basic process and detailed the proper equipment and techniques used to perform a quality titration. Mike went on to explain how to properly fill a buret, flushing out any air bubbles, and the correct way to read the meniscus. Mike explained that titrations are commonly used in the analysis of hardness, alkalinity, and chlorides, among others. Mike showed a demonstration of a titration and explained that the closer you get to the endpoint, the longer the color will stay. He recommended deciding on a color endpoint, before titrating the sample, by running a method blank first. In conclusion, Mike reviewed the best procedures for storing burets and titration supplies.

George Bowman, formerly of the State Lab of Hygiene, gave a presentation on “Total Phosphate & Ammonia-Comparison of Methods”. George started by explaining the sources of ammonia found in wastewater. He discussed the effects of ammonia on aquatic life as concentrations increase. George then explained that there are three commonly used testing methods for ammonia: ISE, colorimetric, and titration. He discussed the advantages and disadvantages of each method, and the equipment and supplies needed for each. The TNT method contains cyanide, which can have disposal considerations; however, this may be a good choice when there is limited staff available. The ISE method, on the other hand, is a good choice for a wide range of concentrations.

George then moved on to phosphorus, explaining the sources of phosphorus found in wastewater. He discussed the options for total phosphorus testing, and the equipment and supplies needed for each method. George emphasized that no matter which method you choose, always remember to neutralize the sample (pH 6-8) prior to analysis. George finished his presentation by covering the advantages and continued on page 16
disadvantages of each method, including safety tips and low level LODs associated with each method.

Chris Groh, Wisconsin Rural Water, followed the break with a presentation on Bulking & Foaming – Getting Rid of Filamentous Bacteria. Chris gave a description of bulking sludge and stated that organisms that cause bulking can also cause foaming. The biggest causes of bulking and foaming are Fats, Oils, and Grease (FOG), low F:M ratios, over-aeration/surfactants, and hydrophobic particles. Chris advised that the best way to identify the cause of the bulking and foaming is to look at the foam under the microscope. He discussed the various filaments and the conditions and causes of their existence. Nocardia and Microthrix can be associated with FOG and over aeration. Wasting is one way to control their growth. Filamentous bacteria can also be associated with low DO conditions. Increasing aeration can help improve the situation.

Following the morning session, the attendees were treated to a spectacular lunch of Prime Rib and Baked Chicken, provided by NCL/NCR. Mike Raynovic, and the Staff at NCL, always provide a great meal and superb hospitality!

Following lunch, Ken Bloom, NCR Treasurer, conducted the business meeting.

1) Call the business meeting to order.
2) Thank you all for coming today. I’d also like to send out a very special thank you to Mike Raynovic and his staff at NCL for hosting today’s meeting, preparing the agenda, providing us rolls and refreshments and a great prime rib and chicken dinner. Please join me in giving them a big round of applause!
3) I’d also like to thank all of today’s speakers (Rick Mealy, Chris Groh, George Bowman, Mike Raynovic, and Mark Mahoney) for taking the time to share their knowledge and expertise with us today.
4) Any questions/comments/changes to the meeting minutes from our last regional meeting in Wausau (NTC) hosted by the RMMSD.
5) Treasurer’s Report Balances; Checking $5,238.49, Escrow $679.01 - Ken Bloom, Treasurer

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7) 53rd Annual WWOA Conference – October 8th-11th, 2019 at the KI Convention Center in Green Bay (Registration form and housing forms can be found in the Clarifier and on the WWOA website. Register early for discounted rates and availability.
8) Steering Committee Nominations – Two new officers are elected each year just prior to the fall meeting. If you or someone you know is interested in running for the steering committee please let one of the officers know so they can be included on next fall’s ballot. (Three-year terms)
9) The North Central district is always looking for communities to host a regional meeting. If you are interested in hosting a meeting, please let a steering committee officer know today before you leave. The steering committee is available to help you organize and plan the meeting agenda, venue, etc.
10) The next Regional Meeting will be September 19th, 2019 and will be hosted by the Village of Spencer. Look for that meeting agenda to come out shortly.
11) Finally, I would like to encourage anyone that is not a member of the WWOA to consider joining. The membership is $50.00 for a two-year membership and benefits include access to all areas of the WWOA website, special discounted rates for the annual conference, workshops, seminars and operator trainings, access to the WWOA library and training aids, student scholarships and tuition aid for members, five issues of the Clarifier magazine (articles, job opportunities, etc.), publication of the membership directory including contact info for individual members and WWTP, and become eligible to receive annual WWOA awards, after certain criteria are met.
12) Open up the floor for any other business
13) Adjourn

Following the business meeting, Rick Mealy, Lab Auditor, formerly of the DNR, gave a presentation on NR 149 Revisions and the new LOD procedure. Rick started by mentioning that the revisions to the NR 149 code have not been approved yet, but are expected to be approved in 2020. The reason for the NR 149 revision was to “fix” what was broken in the code, including reviewing proficiency testing, and laboratory ethics. Rick explained the new criteria for initial calibrations, laboratory control samples, and what realistic LOD values really are. He discussed the new procedure for determining the initial LOD, including using seven spikes and seven blanks in the calculation. He also touched on using your blanks to determine the LOD. Rick finished by explaining that it really is an ongoing annual verification of the LOD. All laboratories must collect and retain all blank data and perform at least two quarterly LOD spikes each year to verify their LOD.

The last session of the day was Optical D.O. Equipment Calibration & Maintenance. Mark Mahoney, NCL Chemist, explained there are three types of DO probes: optical, polarographic, and galvanic. Mark explained how each type of probe works, including the advantages and disadvantages associated with each probe. These consisted of warm-up times, fill or no-fill solution caps, length of cap life, response times, accuracy, and maintenance requirements. Mark explained some of the advantages of optical probes over the other types. He also reviewed the operational and maintenance procedures of optical probes. Mark demonstrated the calibration procedure on a YSI DO Multi-Lab Meter. He explained the proper way to take analytical readings and how to properly store the probe when it’s not in use. In closing, Mark touched on troubleshooting optical and polarographic probes.

The day concluded with an optional tour of the North Central Laboratory facility.

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Many thanks to Mike Raynovic, the staff at NCL, the speakers, and the attendees, for all their preparation and hard work that went into hosting and making this North Central Regional Meeting and Laboratory Training Session a success!

Submitted by: Ken Bloom, NCR Treasurer

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For more information about the 2020 WWOA Annual Conference, Visit our website at www.wwoa.org.

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Exhibitor registration for the 2020 WWOA Annual Conference in Wisconsin Dells is now open.

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Have questions? Contact Caley Mutrie at the WWOA offices at c.mutrie@wwoa.org or call 414-908-4950 x104.

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Laboratory Limelight: PFAS – What’s the hub, bub?

By Rick Mealy, RGM Lab Consulting

Let’s just start by saying that I don’t think any of us would stand in the way of ensuring access to “clean water”. The 800 lb., menacing gorilla in the room however, is “what do we mean by clean?” The grim reality is that there is always a lengthy list of compounds waiting to be the next TetraMethylHorrible, which leads to all kinds of major health problems and even death. So, I’d rephrase the question and ask, “where does one draw the line on what is a real (vs. potential) health threat, and at what level(s)?”

At the risk of sounding like a late-night “as seen on TV” product commercial… but wait… there’s more! With respect to PFAS, there’s a second menacing 800 lb. gorilla in the room: how is one supposed to obtain accurate, reproducible data when the only approved methods that have been published for PFAS is for the main two (PFOA and PFOS) in DRINKING WATER? That’s right; there is no approved method out there for the analysis of wastewater or biosolids! Yet, Lab Certification Program staff are currently out auditing laboratories wishing to be certified for PFAS analytes for analysis in drinking water, wastewater, groundwater, and solid waste (biosolids).

The Wisconsin DNR is currently seeking to add not two (2), but 36 PFAS-related compounds to the list of regulated substances. And, from the Cart-Before-the-Horse Department, there are no published health hazards for at least 30 of these analytes! If we do not even know whether there are adverse health effects to something, why are we regulating it? It begins to look more like a fishing expedition whereby the regulated community (ahem… wastewater plants) are being forced to gather data on these compounds at a cost to the community and the taxpayers.

Why are wastewater plants even involved? Wastewater treatment facilities do not create PFAS; they are only flow through systems. If the concern is the PFAS dischargers, shouldn’t those facilities be evaluated? Or is it a case that the DNR, lacking sufficient staff, is attempting to use municipal wastewater staff to do their work for them? Again… on the taxpayer’s dime.

The DNR requested this past summer that over 100 wastewater treatment facilities voluntarily test their influent and effluent for PFAS. Of course, keep in mind that there are no approved methods, meaning results are so variable as to be potentially meaningless. The other part of this is that in measuring incoming and outgoing levels, we are left with the theory that the difference between the two represents those PFAS that have been incorporated into biosolids. And what do we largely do with biosolids? Why, landspread them, of course. As the public gets whipped into a misinformation frenzy, people start questioning whether PFAS (again we don’t know IF they are health risks or at what levels) being landspread will result in PFAS getting into the food chain. And all of that leads to some fear that maybe people do not want biosolids being spread on their farm fields. THEN what does a municipal facility do with the continual production of biosolids?

Do regulators have any idea the volume of biosolids generated by wastewater plants? If they cannot be landspread, whether by regulation or just fears created by the public and media, what do we do with them? Do they too become labelled as hazardous waste and have to go to a hazardous waste landfill? What do we do when we

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run out of landfill space? Why...create more landfills, of course! And it's not just biosolids! What do we do with our non-stick pans? Gore-Tex gear? Stainmaster carpeting and upholstery? Do we toss all these things in the landfill as well?

But wait...doesn't that only increase the risk of these terrible chemicals from getting to groundwater which is, for many, their drinking water source? Any chess master will tell you to plan a number of moves ahead, but with PFAS we seem to be blind to the consequences of future moves, focusing only on taking the next step to regulate PFAS compounds.

I'm not saying for one minute that certain PFAS compounds do not create health hazards, or that we should do nothing about PFAS. The important point is that we don't even yet know what we don't know, but regulators are racing towards strict regulations. The list is 36 analytes now, but how much bigger will it get? There are over 5000 known “PFAS” related compounds. The general public, or at least a part of them, are leaping to assumptions regarding "possible" links between PFAS and health. Anyone remember BPA?

The bottom line must be that until we have solid, cause-and-effect data that PFAS compounds cause major health issues (and at what levels), we should stand down. Aren't there definitive health hazards elsewhere that aren't being addressed? What ever happened to concern (and hard data) that showed levels of prescription medicines and personal care products getting into our water sources? Things like diabetic medications, painkillers, and psycho tropic drugs are being found in waters, yet suddenly PFAS, which have been in use for over 50 years, trumps these things?

So, can we agree on something?

Certainly, a major volume spill of ANY pure chemical needs to be remediated. We should all be able to agree on that. Yes, there are states that have regulated as many as 6 PFAS compounds. What is interesting is the different levels at which the same compounds are being regulated from state to state. Can we agree that IF there is determined to be health-related effects of PFAS, that the level at which the risk exists is the same for people in one state as another? Why don't we let the Centers for Disease Control do more testing and, if required, determine a uniform, nation-wide maximum concentration limit for a given PFAS analyte? Is that something we could agree on?

At this time, I believe we can all agree that since the EPA has established advisory limits for levels of PFOA and PFOS in drinking water, perhaps we can agree that Wisconsin should adopt a similar approach. And let's stand down on wastewater, biosolids, groundwater and soil at this time.

And PFAS are used in fire-fighting foams. I'd like to think we can all agree that for training situations, firefighters should use non-PFAS based foams. But, when a real fire threatens life and property, don't we all want firefighters to use the best possible agent to put out the fire?

How about we focus on the things we CAN agree on and move slowly towards determining whether more action is required? ☑

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Keep your WWOA membership information up-to-date

If you have moved, changed jobs, have a new postal or email address, please update your membership information. Send an email to customercare@wwoa.org with your updated information. Don't lose out on receiving all the WWOA news and meeting notices, as well as the Clarifier magazine. Update your information today! ☑
33rd Annual Classic Collection System Seminar
Watertown, WI

WHEN: Thursday June 4th, 2020
WHERE: Turner Hall, Watertown, WI

MORNING SESSION:
Collection System Technical Session

Tentative Technical Topics:
Weather forecasts & predicted collection system effects; I&I micro-flow monitoring using level sensors; Trace wire systems for locating underground utilities; Safety: Certifications for overhead cranes – OSHA required; Styrene emissions from steam cured CIPP; DNR – Update/safety Collection systems and GIS; Microbial Induced Corrosion (MIC) - cause & effect

AFTERNOON SESSION:
Vendor presentations and equipment displays, product demonstrations and door prizes

DNR CREDIT HOURS
6 credit hours will be available.

CO-SPONSORS:
Wisconsin Section – Central States Water Environment Association
Wisconsin Wastewater Operators Association (WWOA)

Online Registration when available- www.cswea.org

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Information Contact:
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Mail registration card and fee to:
Tom Kruzick, Jim Murray Inc.
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Safety First: Gas monitoring in wastewater operations

Gas monitors can sometimes be a divisive subject in the safety world. The initial cost of implementing a comprehensive gas monitoring program can be a real barrier; then you must consider the time spent training users on the monitors, applicable software, docking station procedures, bump tests, repairs, and calibration schedules! However, the single most important thing to think about when considering a gas monitoring program is the lives that it can save! The nature of gases makes them inherently dangerous; many are colorless and odorless and by the time you might notice something is wrong, it’s already too late.

Some questions to consider when evaluating potential gas monitors for your program:
1. What gases do you need to monitor?
2. What environment are the monitors going to be used?
3. Do you need a diffusion or pumped monitor?
4. How many users do you have?
5. How many gas monitors do you need?
6. Is it worth it to buy the docking station, calibration gas and kit, or send it out for calibration?
7. How much data do you need?

A quick rundown of “bump testing” vs. “calibration”
A bump test checks the functionality of your gas monitor. This is a simple test that must be done prior to using any gas monitor. Bump test gas is cheap and readily available, and the test simply requires the user to turn on the monitor and blow gas over the sensors (aka “bump” the sensors with gas) in order to make the alarm(s) go off. This is a quick and easy test to ensure you are not going into the field with a defective monitor!

A calibration checks the accuracy of your gas monitor. This requires a bit more equipment and know-how, but is actually very easy to do! Here is the most common equipment required for calibration: gas regulator, calibration gas cylinder, and tubing. The manufacturer will state in the instruction manual what calibration gas mixture must be used and the procedure to follow. Calibration simply “resets” the sensors to the correct sensitivity, making the monitor accurate again. Additionally, calibration procedures often include automatic diagnostics that can tell you if a sensor is bad and need to be replaced!

Should you calibrate yourself or send your monitors in for service? This all depends on how much you want to do yourself, and how much time you have to manage your gas monitoring program. Calibrating is a relatively quick and easy process to learn, but does require some equipment and continued purchase of calibration gas. Most manufacturers require calibration of their monitors every 180 days, and certain units require calibration every 30 days. Over the long run, performing your own calibrations can save you money, but can also be very time-consuming.

Single gas vs Multi-gas monitors
Single gas monitors are often disposable, require no calibration, and no chargers; this makes them very economical and convenient. However, single gas monitors also include very few (if any) technological features that are becoming the standard today, such as data logging, inter-communication, man-down sensors, etc. Therefore, single gas monitors are best reserved for simple situations or short-term jobs that only have a single gas hazard.

Multi-gas monitors (specifically the standard 4-gas: CO, H2S, O2, LEL) are the golden standard used in today’s workplaces. The ability to be used in a wide array of applications, as well as the relatively economical price make them the most common gas monitor you will see in the field. Multi-gas monitors come in a wide range of styles with varied features but will commonly include more advanced technology such as datalogging. Additionally, multi-gas monitors often use rechargeable batteries and need to be charged prior to use.

You might also be aware of new disposable 4 gas monitors out on the market. These are becoming more popular because they combine the features and versatility of a multi-gas monitor, with the ease and convenience of a disposable monitor. These monitors usually are good for 2 years, require no calibration or charging, but after the time is up, they essentially become a paperweight! While these are convenient, the cost associated with replacing a fleet of monitors every couple of years can be a barrier for some.

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Sensor Technology
When we are talking about what type of sensor a gas monitor uses, we are almost always talking about the LEL sensor. There are 2 types that you will find in a gas monitor: pellistor and IR. The pellistor sensor is older technology that uses a heating coil to burn the combustible gases present in the atmosphere in order to detect them. The newer IR sensor uses infrared light and how it is affected by the atmosphere, then it compares that to a reference point to show whether combustible gases are in the atmosphere.

Pellistor sensors have 2 main downsides. First, because they use a controlled burn, they need oxygen in the atmosphere to operate. Therefore, they are not effective in atmosphere with low/no oxygen. Second, they can become “poisoned” if they are subjected to prolonged and/or gas high concentrations, causing inaccurate readings. IR sensors suffer neither of the pellistor drawbacks, but do not work very well in environments with hydrogen or acetylene exposure risks due to the structure of these gases not being easily detected by infrared light. Additionally, IR sensors use much less power than pellistor sensors, leading to longer battery life. IR sensors, however, are not recommended in wet environments.

Diffusion vs Pumped and Confined Space
Another variant of monitor in today's market is the pumped gas monitor. The standard gas monitors that you see in the field with 3, 4 or 5 circular sensors are what is technically called diffusion monitors, as the gas diffuses across the membrane into the sensors. A pumped gas monitor works differently by adding a pump that actively pulls in the atmosphere and pushes it into the sensors.

The most common application for the pumped unit is confined spaces. A pump with a tube and/or sampling rod can allows you to check what is in an atmosphere prior to sending anyone in to work. Additionally, there are 2 main types of pumped monitors, monitors with built in pumps, or monitors that accept a manufactures add-on pump. Monitors with built in pumps tend to larger, have poor battery life, and are purpose built, so they are not very versatile. Monitors that are made to work with a separate add-on pump are more versatile and allow for a single solution.

Written and Submitted by Verona Safety, Madison WI.
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Weyauwega WWTP hosts December Lake Michigan meeting

The December 12th Lake Michigan District meeting at the Weyauwega WWTP was another well attended meeting with over 58 operators, along with 7 equipment and process vendors. A special thanks to Dorner Company for sponsoring the treats during the morning breaks and to Cedar Corporation for providing the dessert for the meal.

The first presentation of the day was given by Jim Martin of Lemna Environmental Technologies, who spoke on Innovative Lagoon Wastewater Treatment: Delivering the Complete Solution through Modeling. As a part of Jim’s presentation, he started by providing the typical benefits of lagoon treatment process, but also covered the shortcomings of the traditional lagoon treatment process. Jim explained that advancements in lagoon treatment have been limited, due to a void of reliable treatment technologies that can be integrated to enhance overall treatment performance, and very little or no theoretical methods for predicting or calculating performance of advanced treatment technologies. Jim then went on and discussed the 5 primary methods for the advancement of lagoon treatment. Following that, Jim then walked the group through the typical LemTec biological treatment process, which is a complete mix cell, then a partial mix cell, phosphorus removal, then a settling cell, followed by a Lemna polishing reactor. This whole process is covered by a modular insulated cover to prevent a loss of temperature. Jim then explained the differences of traditional lagoon treatment design calculations and the new modeling-based design calculations. The presentation ended with a discussion about different case studies.

Next on the agenda was Thomas Steinke from Parkson Corporation. Tom’s presentation was titled Wastewater Screening Options. Tom began the presentation by providing a list of benefits of screening, which are to reduce downstream maintenance labor, increase downstream process system life spans, maintain design efficiencies, and reduce spare parts on downstream processes. Tom then went on to explain the different screen surface options and how the different surfaces affect solids capture rate and maintenance. After that, Tom walked the group through the types of headworks screens currently available, along the associated pros and cons. Tom finished his presentation by discussing the recent case studies to increase the current screening technology.

The third presentation of the day was by Ryan Hennessy of Midwest Contract Operations. Ryan’s presentation was titled Wastewater Microbiology: Causes vs. Problems. Ryan first identified and discussed common issues encountered in the wastewater treatment process. Then, Ryan described common remedial actions for various treatment issues. Ryan ended his presentation by discussing when to act and when it is too late to act. This included plant observations and trends to look for.

Holly Blazer called the WWOA-LMD business meeting to order. Last quarter’s minutes and treasurer’s report were approved.

The next item on the agenda was the WDNR update by Roy Van Gheem. First off, for the WDNR update, the scores from the November 6th exams have been sent out. The second item is that the next exam offering will be on Wednesday, February 5th in Plover. The third item is that WDNR is completing the review of the public comments received on the draft Upper Fox Wolf TMDL. The WDNR is planning to submit the TMDL to the EPA for review and approval shortly. The TMDL report and supporting documents are available for review on the WDNR Upper Fox Wolf TMDL webpage. The fourth and final item is updates regarding recent WDNR staffing changes. Laura Gerold started working, as a wastewater engineer in October, filling the position previously held by Nicole Krueger. Laura works out of the Green Bay office and serves mainly Brown, Oconto, and Marinette counties. The second staffing change to note is that Heidi Schmitt-Marquez is the new wastewater field supervisor for the Northeast Region. Heidi fills the position, previously held by Kelly O’Connor. Heidi will also be working out of the Green Bay office. Following the WDNR update, Josh Voigt gave the WWOA Board of Director’s update.

The last presentation of the day was by Nate Willis, Wastewater Engineer with the Wisconsin Department of Natural Resources. Nate’s presentation was titled: PFAS Overview and Water Quality Program Update. Nate started off by talking about what are PFAS and where they came from. Nate also discussed the problems that PFAS cause. Nate then went into explaining the different wastewater treatment options. Lastly, Nate finished the presentation by giving a water quality program update regarding monitoring and rule-making efforts.

Kyle Young, the Wastewater Plant Manager, gave an introduction of the WWTP by describing the flows, loadings, and treatment processes. A self-guided plant tour followed the plant introduction. 

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The next meeting date is February 13th, 2019 at the Sturgeon Bay WWTP. Thanks to the Weyauwega staff for hosting the meeting.

Reminder, meeting presentations, if allowed by the presenter, can be found on the WWOA website on the Lake Michigan District region’s page.

Minutes submitted by Josh Steffeck, Lake Michigan District Secretary/Treasurer

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Correction to the Southeast Region Kenosha meeting minutes

Some corrections to the meeting minutes found in the December issue of the Clarifier are needed.

The corrections are as follows:

1. There have not been any changes in the State’s code and policy of setting interim effluent phosphorus limits for POTW discharges directly to Lake Michigan and Superior. – The minutes indicated that Lake Michigan discharge requirements were updated. Chapter NR 217, Wis. Adm. Code has not changed from stating that the total phosphorus criteria for Lake Michigan and Lake Superior are extremely low, and therefore the Department should base effluent limits for Great Lakes dischargers on results of an approved model which is still not available.

2. The interim phosphorus limit is typically set close or equal to 0.6 mg/l. – The minutes contained a typo suggesting the interim limit was set to 0.06 mg/L. Section 217.13(4), Wis. Adm. Code still contains the 0.6 mg/L value.

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NCR WWOA Steering Committee Meeting
12/02/19, 9:00 AM, Mosinee, WI – Mosinee Cafe

AGENDA
Selection of officers for 2020
Chair – Eric Donaldson; Vice-Chair – Pat Morrow; Secretary – Diane Thoune; Treasurer – Rob Szekeress
Chris gave a description of each of the officers’ positions.
Chair – Face of region, present annual operator’s award, run business meeting. Vice-Chair – Serve as backup to Chair. Secretary – Take notes at meetings, communicate with WDNR; Chris sent a list of notes. Treasurer – Handle finances and meeting registrations; region’s checking account is currently at Connexus; Ken/Rob will change the name on the account. Remember that Caley Mutrie is our contact/resource at the State level. Chris started a SOP for the region (especially regarding progression of officers), but didn’t finalize it because the State hasn’t updated theirs for a very long time.

North Central Region – 2020 Upcoming Meetings. Three meetings are required. Winter/Spring–usually occurs in February/March. Eric will contact Stevens Point – have said they’re willing to host; finishing a biosolids project with Donohue – give summary and discuss upgrades. Travis will set up meeting at Mid-State Technical College. WRWA is March 17 – 20; don’t conflict with it. Spring/Summer–will try for early June. Summer/Fall – will try for August. Diane will talk to Becky at North Central Laboratories (NCL) (Ken has contact info). Mike at NCL is an important contact; he’s always willing to help; he handles the registration and program for the NCL meeting. Remember to take pictures at meetings.

Future Meeting Sites–Pat offered to make contacts: Rhinelander – future meeting, after staffing is sorted out; the technical college is a nice venue. Bruce Johnson at Carter (casino). Diane will contact Mullins Cheese – have a new Blue Pro process. Hopefully one of these will work out as Spring/Summer meeting. Other options: Marathon City or Edgar when they decide what they finalize plans for their plants; Northern Lake Service – have said they’re willing; Wisconsin Rapids; Minocqua; Mosinee Paper?

General meeting notes–We can set up the classes if the community is willing to host and hold a tour. Get date on WWOA website as placeholder. Best to start planning as early as possible! Get agendas set 4 – 6 weeks before the meeting; the earlier the better. Rob can easily get presenters.

Septage and water credits take longer to get approved and are more difficult to get; might have to submit the presentation or an outline. Secretary (Diane) will submit the agendas to the WDNR; see the Operator Certification page on their website. Don’t post the agenda until the credits are approved. Good to spread meeting sites around the region. Someone has to take notes (usually Diane). Someone has to take pictures!

Possible themes, topics, or presenters–Set up the agendas 4-6 weeks before the meetings; earlier helps. NLS can discuss PFAS (they’re certified for drinking water); Tracy can help – Pat can ask, especially if we’re having a meeting in the Crandon area. Low-level phosphorus plants are now online – discuss performance data and costs. Biosolids – discuss drying and incineration to break down PFAS. Site-specific TMDL is supposed to be final by the end of summer. E. coli vs. fecal coliforms. Plant resilience and safety.

Operators Competition–We did not have a team this year. Travis will contact Jake to see if he will lead the effort; Travis will serve as a resource. This needs to be worked on all the time. Get team all the information, support, equipment (hard hats, shirts, etc.) they need; possibly ask vendors for support. If Jake is willing, he should start assembling the team. Ethan from Spencer might be interested in joining; possibly someone else from Marshfield. Best to keep team together for a few years – these teams do the best. Show up for competition to support the team. Possibly do a demo/give info on competition at the March meeting. Region sends gift cards to the competitors around Christmas.

Other training sponsored by the region–Maybe Peterson and Matz – equipment training? Send these training notices to all regions.

Social Media–LinkedIn and Twitter accounts still exist – Katie Gruber from B&H has access to them. Our Facebook page is up. Eric will take over as moderator. Remember to feed content to him! Watch people’s comments on our page! Focus on content that’s important to us. Use to thank our vendors.

Old Business–Member sponsorships. State organization is supportive of this. Bring applications to meetings and have new members fill them out right away. Record the new members’ names and include them in the annual report.

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Checking account balance—Ken handed out the current 2018-2019 and 2019-2020 financial statements. Watch balance; ours is on the low end compared to other regions, but it still doesn’t need to be this high. Use funds for prizes/WWOA gear to give away at the meetings.

Meeting registration—Still have to go through the State to see who’s registered for the regional meetings. We don’t have access to the registration section of the website.

New Business—Clarifier articles: None of our 2019 meeting minutes have been published yet. Diane will submit them to Jon Butt at the Clarifier. Submit the NCL minutes first. The articles should be substantial and include information from the meeting.

Operator of the Year—Still need to get award to Andy Ott. Eric will contact Sam Warp. Present at Commission meeting if possible. We need a picture! Make sure we get the winning operator (or a representative) to the conference to accept the award. The previous three years’ winners make up the selection committee. They used to visit or call the nominees in order to decide on the winner. July 1st is the deadline for the region. The State needs to be notified of the winner by August 1st. The nomination forms are on the website. Wausau Awards & Engraving has our logo for awards.

Quarterly update—Other regions send these out. List highlights, upcoming training, etc. Maybe we can think about doing something similar in the future.

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**Upcoming Events**

February 19, 2020  
Southern Region Meeting, Muscoda, WI

February 20, 2020  
Government Affairs Seminar, Fond du Lac, WI

February 27, 2020  
2020 PFAS: Beyond the Theoretical and What’s Working, Madison, WI

March 5, 2020  
Southeast Region meeting, Port Washington, WI

March 17, 2020  
Spring Biosolids Symposium, Stevens Point, WI

April 23, 2020  
Ammonia Analysis Laboratory Training Session, Mequon, WI

October 20-23, 2020  
WWOA Annual Conference, Wisconsin Dells, WI

For information about these and other events happening throughout 2020, visit the WWOA Events Calendar at https://www.wwoa.org/calendar/.
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